REMARKS/ARGUMENTS

In view of both the amendments presented above and the following discussion, the Applicants submit that none of the claims now pending in the application is anticipated under the provisions of 35 USC § 102. Thus, the Applicants believe that all of these claims are now in allowable form.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, the Examiner should telephone Aubrey Helms, Jr. at (408) 504-8199 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Claims 23-28 and 39-48 are presently in the application.

The Examiner has objected to the language and format for the abstract. The Applicants herein offer a replacement abstract for the present application. The replacement abstract is presented as an attachment to this paper.

The Examiner notes that claim 26 recites the limitation "the longitudinal orientation of the fiber" in line 3 and urges that there is insufficient antecedent basis for this limitation in the claim. Applicants have reviewed this contention and repeat the previous proposal to direct the Examiner's attention to the fact that any fiber has a longitudinal orientation, thereby implicitly providing an

antecedent basis. Accordingly, the objection is considered unwarranted. However, Applicants have currently amended claim 23 and added language to explicitly describe the longitudinal axis of the fibre. Applicants submit that this is not new matter since it is an inherent property of any fibre.

Claims 23-28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Homann (US 5,937,732). The Examiner urges that with regard to claim 23, the reference discloses a fluid-tight body overwound as an isotensoide with a number of fiber filaments, whereby the radius of the body varies with respect to a rotation-symmetrical axis of the structure, such that said body comprises a number of concave surface sections spaced apart from the axial ends, each having a local minimum radius, and a number of convex surface sections spaced apart from the axial ends, each having a local maximum radius characterized in that at least one concave surface section is continuously overwound with a fiber as an isotensoide.

With regard to claim 24, the Examiner urges that Homann shows that the fiber windings in the at least one concave surface section comprises a non-pressurized state of the structure a multiple number of substantially straight fiber filaments forming a hyperboloid.

With regard to claim 25, the Examiner urges that Homann shows that the fluid-tight body is quasi-geodesically (as long as there is no movement there will inherently be a quasi-geodesically amount of friction) overwound in a continuous fashion.

With regard to claim 26, the Examiner urges that Homann shows that the longitudinal orientation of the fiber along a finite length thereof is oriented substantially perpendicular with respect to the rotation symmetrical axis of the structure.

With regard to claim 27, the Examiner urges that Homann shows that the fiber in a pressurized state undergoes torsion with respect to its longitudinal center line, so that substantially one side of the curved fiber remains in contact with the body in the at least one concave surface section.

With regard to claim 28, the Examiner urges that Homann shows that in a pressurized state there is reversal of the side of the curved fiber which is in contact with the body in the at least one concave surface section.

The rejections of the Examiner set forth above are deemed incorrect for the following reasons:

Applicants have taken the opportunity to amend several of the claims to improve the wording and the reading of the claims. Applicants propose that the changes in the wording have not altered the original scope of the amended claims.

Applicants' invention is directed to a fiber-reinforced gas or fluid-tight structure with a varying radius with regard to an axis of symmetry such that the body comprises a number of convex and concave surface sections,

or at least one concave section, and by overwinding the body with filaments such that at least one concave surface section is continuously overwound with a fiber as an isotensoide, a substantially isotensoidal body is obtained which has excellent performance in terms of volume, pressure, and mass.

This performance is attained since in isotensoidal bodies the applied fibers are tensioned in exactly the same magnitude, so that optimal use of material properties is made. Accordingly, the body may endure high pressures and has a relatively large shape stability. Variations of the pressure inside the body results in variation of the envelope stiffness. By the formation of rotationally symmetrical bodies with varying radius in an isotensoidal way, advantageous applications may be found. More specifically, elongated objects can be formed making the bodies available for a wide variety of applications. The combination of flexibility of the body and the ability to endure pressure loadings makes it suitable for flexible pipes and hydraulic applications.

The Homann reference discloses a procedure for overwinding a cylinder wherein fibers 9 run between end caps 4 and 5. The end caps are provided with arms 10 allowing the fibers to return. The fibers disclosed are oriented in a direction substantially parallel to the longitudinal axis of the cylinder (see column 7, lines 7-12 of the reference). The offset of the arms in the circumferential direction results in a deviation of several degrees. When inflating the cylinder, a radial expansion is limited due to a number of non-elastic ring shaped elements.

As a result, a bellow shaped structure is obtained wherein the fibers are subjected to a radial force causing the end caps to move toward each other.

Contrary to the position of the Examiner, it is noted that the structure disclosed by Homann is not continuously overwound as an isotensoide. Since the fibers are overwound using the arms at the end caps, the fibers are not isotensoide. Figure 2 of Homann illustrates the apparatus under pressure with the addition of the non-elastic ring shaped elements. In this case, not all of the fibers are tensioned in exactly the same magnitude. The portions of the fibres under the non-elastic ring shaped elements experience a force directed toward the axis of the structure by the presence of the ring elements. If the non-elastic ring shaped elements of Homann were removed, the structure would form a single chamber with a convex shape. Therefore, the fibres cannot be considered to be wound as an isotensoide. Additionally, this chamber with a single convex shape does not read on the elements of claim 23 of the present invention wherein at least one concave surface section is required. Therefore, Homann does not anticipate claim 23 of the present invention.

In sharp contrast to Homann, the fibres of the present invention are wound in an isotensoide structure whereby a structure may be constructed having at least one concave section and at least one convex section without the use of external, non-elastic, confining devices (i.e., ring elements or spiral elements). Due to the force balance in

an isotensoide fiber structure, ring-shaped elements are superfluous in the structure described in the present invention.

Applicants also contend that the Examiner is incorrect in his evaluation of Figures 6-7 of Homann. In Figures 6-7 of Homann, the fibres are all wound substantially parallel to the axis of the structure as is the case in Figures 1-5. The structure that exhibits an orientation that is substantially perpendicular to the axis of the structure is the "inelastic cylindrical spiral" element 14 as identified in Figure 6. This inelastic cylindrical spiral serves the same purpose as the non-elastic ring shaped elements listed in Figures 1-2. That is, it serves to limit the radial expansion of the main chamber and to divide the main chamber of the system into small chambers so that the reaction of the system to increases or decreases in pressure will be more consistent and uniform (see 5:53-67).

Claims 39-48 are former claims 29-38 which were accidently withdrawn during the response to a preceding office action indicating a restriction requirement. As the Examiner had properly stated, Group III consisted of claims 23-38 and were drawn to a product. At that time, the Applicants selected Group III, but only listed claims 23-28 in the response. Thus, the Applicants inadvertently cancelled claims 29-38. Applicants direct the Examiner to note that these are dependent claims arising from claim 23. In accordance with the USPTO procedures, these claims are being introduced as new claims numbered 39-48.

Applicants note that claims 24-28 and 39-48 are dependent claims that refer to claim 23. Since they must comprise all of the elements found in claim 23 and claim 23 has been argued to be patentable over Homann, then these claims must also be patentable over Homann.

In light of the foregoing contention of applicants, it is urged that the rejection of claims 23-28 be withdrawn and that claims 39-48 be allowed and the application passed to issue.

Respectfully submitted,

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